

Claims

1. A glucose extraction patch comprising:
two hydro gel discs each of which containing enzyme for generating hydrogen
5 peroxide in reaction with glucose;
a frame with two holes formed in it for accommodation of said two gel discs; and
a flexible circuit board attached on the upper part of said frame having electrodes
formed at positions facing said two gel discs respectively, terminals for connection with a
measuring instrument, and a circuit means for electric connections between said electrodes
10 and said terminals.

2. The glucose extraction patch of Claim 1, comprising additionally a film attached
on the bottom of said frame with two holes formed in it, said holes having a smaller
diameter than those of said frame and being formed to face said holes of said frame.
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3. The glucose extraction patch of Claim 1, comprising additionally supporting
wings formed slightly extruding to the center of said holes from the bottom part of said
holes in said frame for support of said gel discs.

20 4. The glucose extraction patch of Claim 1, wherein the bottoms of said gel discs
are smaller sized than the upper surfaces thereof, and said two holes of said frame are
shaped to accommodate said gel discs.

5. A glucose extraction patch in any one of Claims 1 through 4, wherein said

electrodes comprise:

a first and a second extraction electrodes formed using platinum ink containing carbon, or ink containing Ag/AgCl, which extract glucose from an intact skin;

5 a working electrode formed using ink containing platinum and carbon, which applies voltage for measuring the current generated by reaction of said hydro gel with glucose extracted;

a reference electrode formed using ink containing Ag/AgCl, which serves as the basic electric potential in measuring said current generated by reaction of said hydro gel and glucose extracted; and

10 a counter electrode formed using platinum ink containing carbon, which measures said current generated by reaction of said hydro gel and glucose extracted.

6. The glucose extraction patch of Claim 5, wherein the ratio of platinum to carbon in said working electrode is 95:5 by weight.

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7. The glucose extraction patch of Claim 5, wherein

said first extraction electrode, having a ring shape, is installed at a location facing one of said hydro gel discs;

20 said second extraction electrode, having a broken ring shape, is installed at a location facing the other hydro gel disc;

said working electrode, having a circle shape, is installed at a location inside of said broken ring shape second extraction electrode; and

said reference electrode as well as said counter electrode are connected in series at location where said ring of said second extraction electrode is broken.

8. The glucose extraction patch of Claim 5, wherein
said first extraction electrode, having a ring shape, is installed at a location facing
one of said hydro gel discs;
5 said second extraction electrode, having a broken ring shape, is installed at a
location facing the other hydro gel disc;
 said working electrode, having a circle shape, is installed at a location inside of
said broken ring shape second extraction electrode; and
 said reference electrode as well as said counter electrode are connected in parallel
10 at location where said ring of said second extraction electrode is broken.

9. The glucose extraction patch of Claim 5, wherein
said first extraction electrode, having a ring shape, is installed at a location facing
one of said hydro gel discs;
15 said second extraction electrode, having also a ring shape, is installed at a location
facing the other hydro gel disc;
 said working electrode, having a circle shape, is installed at a location inside of
said ring shape second extraction electrode; and
 said reference electrode as well as said counter electrode, each having a half ring
20 shape, are located to surround the outside of said ring shape second extraction electrode.

10. The glucose extraction patch of Claim 5, wherein
said electrodes undergo an additional preprocessing step of oxidation using cyclic
voltammetry in the range of 0.0~1.2V, after they have been dipped in a sulfuric acid

solution of 0.01~10M.

11. The glucose extraction patch of Claim 1, wherein said electrodes, said terminals and said circuits are formed on the same surface of a flexible circuit board and
5 the circuit board parts where said terminals are formed are cut-off to allow said terminals to be exposed to the rear surface of said circuit board.

12. The glucose extraction patch of Claim 11, wherein said flexible circuit board is adhered to said frame using an insulating adhesion means, whereby said adhesive is
10 sprayed on said circuit board except for the parts of said electrodes.

13. A glucose extraction patch manufacturing process comprising:

a first step wherein said hydro gel discs are put into holes in said frame provided for accommodation thereof;

15 a second step wherein said terminals as well as said circuit patterns are formed with copper wire on flexible circuit board film;

a third step wherein a mask with an electrode pattern made of a first material is set on the surface where said circuit patterns are formed, and ink made of said first material is sprayed thereon and then cured;

20 a fourth step wherein said third step is repeated for each electrode material;

a fifth step wherein said film with electrodes formed on it is cured for a predetermined period of time; and

a sixth step wherein said cured film is sprayed with adhesive except for the electrode parts, and then adhered to said frame containing said hydro gel discs.

14. The glucose extraction patch manufacturing process of Claim 13, wherein said electrodes undergo, after said fifth step, an additional step of oxidation using cyclic voltammetry in the range of 0.0~1.2V, after they have been dipped in a sulfuric acid
5 solution of 0.01~10M.

15. The glucose extraction patch manufacturing process of Claim 13, wherein said curing time at said fifth step is three hours.

10 16. The glucose extraction patch manufacturing process of Claim 13, wherein the parts of said flexible circuit board film corresponding to said terminals are all cut-off.

17. The glucose extraction patch manufacturing process of Claim 13 comprising an additional step wherein a film having holes with a diameter smaller than that of said
15 hydro gel discs is adhered to the surface of said frame opposite to the surface on which said flexible circuit board is attached, in a manner that said holes correspond to said hydro gel discs.